The 31-gene expression profile (i31-GEP) test for cutaneous melanoma assesses the risk of sentinel lymph node biopsy (SLNB) positivity and regional recurrence, distant metastasis, and melanoma-specific survival (MSS) using the primary tumor genetic profile.1,2,3

SLNB has a more than 80% negativity rate, and many patients with a negative SLNB experience disease recurrence or death.1,2,3

The purpose of this study was to demonstrate the combined ability of two independently validated algorithms that incorporate the i31-GEP with clinicopathologic features to predict individual SLNB positivity risk and recurrence-free survival (RFS).

Using artificial intelligence techniques, an algorithm to determine the individual likelihood of outcomes based on Kaplan-Meier analysis and were not evaluated further in this study. Patients with at least 5% SLN risk were analyzed by the i31-GEP algorithm for outcomes to identify high and low risk patients. DMFS: distant metastasis-free survival.

Results

Figure 2. Five-year RFS for patients stratified by i31-GEP risk groups in SLN negative and positive patient populations.

Figure 3. Five-year RFS and DMFS for patients with stage IIB-IIIC disease.

Methods

- Using artificial intelligence techniques, an algorithm to determine the individual likelihood of SLN positivity was developed from 1398 cases and validated in an independent cohort of 1674 cases and validated in an independent cohort of stage IIA (523 cases) and stage IIB (111 cases). Based on the available data, 99% of patients in the validation cohort did not receive PD-1, CTLA-4, or BRAF/MEK adjuvant therapy.

- To create risk-cut points that align with NCCN treatment recommendations, the midpoints between stage IA and IB was set as the risk cut point for RFS (69.7% vs. 66.5%). Those with an i31-GEP outcomes predicted RFS or DMFS higher than the cut-off were classified as low risk. Otherwise, they were classified as high risk.

- To evaluate the prognostic value of using both i31 GEP algorithms, the subset of patients (N=433) utilized in the development of either algorithm was analyzed first by i31-GEP. SLNB, followed by i31-GEP outcomes.

Figure 1. Analysis protocol. All patients received i31-GEP for cutaneous melanoma.

Integrating the 31-gene expression profile and clinicopathologic data to determine the risk of sentinel lymph node positivity and recurrence-free survival in cutaneous melanoma

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Conclusions

- The i31-GEP for SLNB identified 31.2% (135/433) of patients with a <5% likelihood of SLN positivity and these patients had high survival rates, showing that these patients could safely forego SLNB.

- In the SLN negative population, 20% of patients identified as high risk by the i31-GEP result and had 5-year RFS rates that were identical to patients with stage III disease (47.7% vs. 48.7%, respectively).

- Overall, using NCCN treatment recommendations, the i31-GEP test identified 44.8% (194/433) of patients who could have avoided SLNB or were re-stratified as low or high risk compared to SLN status alone.

- The i31-GEP can stratify patients with stage IIB-IIIC melanoma according to risk of recurrence or distant metastasis.

- Using the combined i31-GEP integrated approach can identify patients who may potentially forego SLNB and those with high and low risk of recurrence for more personalized patient care decisions.

Acknowledgments & Disclosures

- We would like to thank the patients and clinicians who received test results through Castle.

- This study was sponsored by Castle Biosciences, Inc.

- BM, AQ, CB, and KC are employers and shareholders of Castle Biosciences, Inc.; EW and JV are on the speaker’s bureau for Castle Biosciences, Inc. NT has no conflicts.

References


Presented at the 2021 Fall Clinical Dermatology Conference in Las Vegas, NV-October 21-24, 2021.